

## AMENDMENTS

### Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

#### Listing of Claims:

1. (Cancel)
2. (Currently amended) The plant cell of claim [[1]] 3, wherein said chimeric isoprenoid synthase polypeptide catalyzes the production of at least two different isoprenoid reaction products.
3. (Previously presented) A plant cell comprising a nucleic acid molecule encoding a chimeric isoprenoid synthase polypeptide selected from the group consisting of (a) the *tobacco-Hyoscyamus* CH4 chimeric isoprenoid synthase; (b) the *tobacco-Hyoscyamus* CH10 chimeric isoprenoid synthase; (c) the *tobacco-Hyoscyamus* CH11 chimeric isoprenoid synthase; (d) the *tobacco-Hyoscyamus* CH12 chimeric isoprenoid synthase; (e) the *tobacco-Hyoscyamus* CH13 chimeric isoprenoid synthase; and (f) the *tobacco-Hyoscyamus* CH14 chimeric isoprenoid synthase.
4. (Currently amended) The plant cell of claim [[1]] 3, wherein said chimeric isoprenoid synthase polypeptide catalyzes the production of an antifungal agent.
5. (Currently amended) The plant cell of claim [[1]] 3, wherein said chimeric isoprenoid synthase polypeptide catalyzes the production of an antibacterial agent.
6. (Currently amended) The plant cell of claim [1] 3, wherein said chimeric isoprenoid synthase polypeptide catalyzes the production of an antitumor agent.

7. (Currently amended) A transgenic plant comprising a nucleic acid molecule encoding a chimeric isoprenoid synthase that comprises a domain from a first isoprenoid synthase selected from the group consisting of (a) the *tobacco-Hyoscyamus* CH4 chimeric isoprenoid synthase; (b) the *tobacco-Hyoscyamus* CH10 chimeric isoprenoid synthase; (c) the *tobacco-Hyoscyamus* CH11 chimeric isoprenoid synthase; (d) the *tobacco-Hyoscyamus* CH12 chimeric isoprenoid synthase; (e) the *tobacco-Hyoscyamus* CH13 chimeric isoprenoid synthase; and (f) the *tobacco-Hyoscyamus* CH14 chimeric isoprenoid synthase, joined to a domain from a second, different isoprenoid synthase, whereby said chimeric isoprenoid synthase polypeptide catalyzes the production of an isoprenoid reaction product that is not produced in the absence of said domain from said second, different isoprenoid synthase, wherein:

(a) said first isoprenoid synthase catalyzes the production of an isoprenoid reaction product of said first isoprenoid synthase, but does not catalyze the production of an isoprenoid reaction product of said second, different isoprenoid synthase;

(b) said second, different isoprenoid synthase catalyzes the production of an isoprenoid reaction product of said second, different isoprenoid synthase, but does not catalyze the production of an isoprenoid reaction product of said first isoprenoid synthase;

(c) said domain from said first isoprenoid synthase occupies a first position in said chimeric isoprenoid synthase polypeptide, said first position in said chimeric isoprenoid synthase polypeptide corresponding to a position in said first isoprenoid synthase occupied by said domain from said first isoprenoid synthase; and

(d) said domain from said second, different isoprenoid synthase occupies a second position in said chimeric isoprenoid synthase polypeptide, said second position in said chimeric isoprenoid synthase polypeptide corresponding to a position in said second, different isoprenoid synthase occupied by said domain from said second, different isoprenoid synthase, wherein the chimeric isoprenoid synthase polypeptide folds into a tertiary structure that results in synthase activity, and wherein the chimeric isoprenoid synthase polypeptide includes therein a ratio-determinant domain that influences the relative ratio of reaction products generated by the chimeric isoprenoid synthase polypeptide.

8. (Original) The transgenic plant of claim 7, wherein said chimeric isoprenoid synthase polypeptide catalyzes at least two different isoprenoid reactions.

9. (Previously presented) The transgenic plant of claim 7, wherein said domain from said second, different isoprenoid synthase comprises the ratio-determinant domain of said chimeric isoprenoid synthase polypeptide.

10. (Previously presented) The transgenic plant of claim 9, wherein said ratio-determinant domain of said chimeric isoprenoid synthase polypeptide determines the ratio of production of isoprenoid reaction products of said chimeric isoprenoid synthase polypeptide.

11. (Original) The transgenic plant of claim 7, wherein said domain from said first isoprenoid synthase is from a plant isoprenoid synthase and said domain from said second different isoprenoid synthase is from a plant isoprenoid synthase.

12. (Previously presented) A transgenic plant comprising a nucleic acid molecule encoding a chimeric isoprenoid synthase polypeptide selected from the group consisting of (a) the *tobacco-Hyoscyamus* CH4 chimeric isoprenoid synthase; (b) the *tobacco-Hyoscyamus* CH10 chimeric isoprenoid synthase; (c) the *tobacco-Hyoscyamus* CH11 chimeric isoprenoid synthase; (d) the *tobacco-Hyoscyamus* CH12 chimeric isoprenoid synthase; (e) the *tobacco-Hyoscyamus* CH13 chimeric isoprenoid synthase; and (f) the *tobacco-Hyoscyamus* CH14 chimeric isoprenoid synthase.

13. (Currently amended) The transgenic plant of claim ~~[[7]]~~ 12, wherein said chimeric isoprenoid synthase polypeptide catalyzes the production of an antifungal agent.

14. (Currently amended) The transgenic plant ~~cell~~ of claim ~~[[7]]~~ 12, wherein said chimeric isoprenoid synthase polypeptide catalyzes the production of an antibacterial agent.

15. (Currently amended) The transgenic plant cell of claim [[7]] 12, wherein said chimeric isoprenoid synthase polypeptide catalyzes the production of an antitumor agent.

16. (Currently amended) A plant cell comprising a nucleic acid molecule encoding a chimeric isoprenoid synthase that comprises a domain from a first isoprenoid synthase selected from the group consisting of (a) the *tobacco-Hyoscyamus* CH4 chimeric isoprenoid synthase; (b) the *tobacco-Hyoscyamus* CH10 chimeric isoprenoid synthase; (c) the *tobacco-Hyoscyamus* CH11 chimeric isoprenoid synthase; (d) the *tobacco-Hyoscyamus* CH12 chimeric isoprenoid synthase; (e) the *tobacco-Hyoscyamus* CH13 chimeric isoprenoid synthase; and (f) the *tobacco-Hyoscyamus* CH14 chimeric isoprenoid synthase, joined to a domain from a second, different isoprenoid synthase, whereby said chimeric isoprenoid synthase polypeptide catalyzes the production of an isoprenoid reaction product that is not produced in the absence of said domain from said second, different isoprenoid synthase, wherein:

(a) said first isoprenoid synthase catalyzes the production of an isoprenoid reaction product of said first isoprenoid synthase, but does not catalyze the production of an isoprenoid reaction product of said second, different isoprenoid synthase;

(b) said second, different isoprenoid synthase catalyzes the production of an isoprenoid reaction product of said second, different isoprenoid synthase, but does not catalyze the production of an isoprenoid reaction product of said first isoprenoid synthase;

(c) said domain from said first isoprenoid synthase occupies a first position in said chimeric isoprenoid synthase polypeptide, said first position in said chimeric isoprenoid synthase polypeptide corresponding to a position in said first isoprenoid synthase occupied by said domain from said first isoprenoid synthase; and

(d) said domain from said second, different isoprenoid synthase occupies a second position in said chimeric isoprenoid synthase polypeptide, said second position in said chimeric isoprenoid synthase polypeptide corresponding to a position in said second, different isoprenoid synthase occupied by said domain from said second, different isoprenoid synthase, wherein the chimeric isoprenoid synthase polypeptide folds

into a tertiary structure that results in synthase activity, and wherein the chimeric isoprenoid synthase polypeptide includes therein a ratio-determinant domain that influences the relative ratio of reaction products generated by the chimeric isoprenoid synthase polypeptide.

17. (Previously presented) The plant cell of claim 16, wherein said domain from said second, different isoprenoid synthase comprises the ratio-determinant domain of said chimeric isoprenoid synthase polypeptide.

18. (Previously presented) The plant cell of claim 17, wherein said ratio-determinant domain of said chimeric isoprenoid synthase polypeptide determines the ratio of production of isoprenoid reaction products of said chimeric isoprenoid synthase polypeptide.

19. (Currently amended) The plant cell of claim 16, wherein said domain ~~from said first isoprenoid synthase is from a plant isoprenoid synthase and said domain from~~ said second different isoprenoid synthase is from a plant isoprenoid synthase.

20. (Previously presented) The plant cell of claim 2, wherein the isoprenoid reaction products are 5-epi-aristolochene and vetispiradiene.

21. (Previously presented) The plant cell of claim 2, wherein the chimeric isoprenoid synthase comprises:

(a) a first domain controlling the synthesis of a first isoprenoid reaction product;

(b) a second domain controlling the synthesis of a second isoprenoid reaction product; and

(c) a third domain located between the first and second domains, the third domain acting as the ratio-determinant domain and controlling the relative ratio of the first and second isoprenoid reaction products produced.

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25. (Currently amended) The transgenic plant of claim [[24]] 12, wherein said chimeric isoprenoid synthase polypeptide catalyzes the production of at least two different isoprenoid reaction products.

26. (Currently amended) The transgenic plant of claim [[25]] 12, wherein the isoprenoid reaction products are 5-epi-aristolochene and vetispiradiene.

27. (Currently amended) The transgenic plant of claim [[24]] 12, wherein the chimeric isoprenoid synthase comprises:

(a) a first domain controlling the synthesis of a first isoprenoid reaction product;

(b) a second domain controlling the synthesis of a second isoprenoid reaction product; and

(c) a third domain located between the first and second domains, the third domain acting as the ratio-determinant domain and controlling the relative ratio of the first and second isoprenoid reaction products produced.

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